AMENDMENTS TO THE CLAIMS

Please amend claims 1-2, 5-10, 18-20 and 22 as follows. Claims 3-4 and 25-32 are canceled. Claims 33-36 are new.

1. (Currently Amended) A process for translating M audio input signals, each associated with a direction, to N audio output signals, each associated with a direction, wherein N is larger than M, M is two or more and N is a positive integer equal to three or more, comprising

providing an M:N variable matrix,

applying said M audio input signals to said variable matrix,

deriving said N audio output signals from said variable matrix, and

controlling said variable matrix in response to measures of (1) the relative levels of said input signals, and (2) the cross-correlation of said input signals so that a soundfield generated by said output signals has a compact sound image in the nominal ongoing primary direction of the input signals when the input signals are highly correlated, the image spreading from compact to broad as the correlation decreases and progressively splitting into multiple compact sound images, each in a direction associated with an input signal, as the correlation continues to decrease to highly uncorrelated,

wherein for a measure of cross-correlation of the input signals having values in a first range, bounded by a maximum value and a reference value, the soundfield has a compact sound image when the measure of cross-correlation is said maximum value and has a broadly spread image when the measure of cross-correlation is said reference value, and for a measure of cross-correlation of the input signals having values in a second range, bounded by said reference value and a minimum value, the soundfield has said broadly spread image when the measure of cross-correlation is said reference value and has a plurality of compact sound images, each in a direction associated with an input signal, when the measure of cross correlation is said minimum value.

2. (Currently Amended) A process according to claim 1 or claim 36 wherein said M:N variable matrix is a variable matrix having variable coefficients or is a variable matrix having fixed coefficients and variable outputs, and said variable matrix is controlled by varying the variable coefficients or by varying the variable outputs.

3.-4. (Canceled)

5. (Currently Amended) A process according to claim ~~4~~ 1 wherein said reference value is about the value of a measure of cross-correlation of the input signals for the case of equal energy in each of the outputs.

6. (Currently Amended) A process according to claim ~~3~~ 1 or claim 36 wherein a measure of the relative levels of the input signals is in response to a smoothed energy level of each input signal.

7. (Currently Amended) A process according to ~~claim 3 or~~ claim 6 wherein a measure of the relative levels of the input signals is a nominal ongoing primary direction of the input signals.

8. (Currently Amended) A process according to claim ~~3~~ 1 wherein a measure of the cross-correlation of the input signals is in response to a smoothed common energy of the input signals divided by the M^{th} root of the product of the smoothed energy level of each input signal, where M is the number of inputs.

9. (Currently Amended) A process according to ~~any one of claims 6, 7 or 8~~claim 6 wherein the smoothed energy level of each input signal is obtained by variable-time-constant time-domain smoothing.

10. (Currently Amended) A process according to ~~any one of claims 6, 7 or 8~~claim 6 wherein the smoothed energy level of each input signal is obtained by frequency-domain smoothing and variable-time-constant time-domain smoothing.

11. (Original) A process according to claim 8 wherein the common energy of the input signals is obtained by cross-multiplying the input amplitude levels.

12. (Original) A process according to claim 11 wherein the smoothed common energy of the input signals is obtained by variable-time-constant time-domain smoothing the common energy of the input signals.

13. (Original) A process according to claim 12 wherein the smoothed energy level of each input signal is obtained by variable-time-constant time-domain smoothing.

14. (Original) A process according to claim 11 wherein the smoothed common energy of the input signals is obtained by frequency-domain smoothing and variable-time-constant time-domain smoothing the common energy of the input signals.

15. (Original) A process according to claim 14 wherein the smoothed energy level of each input signal is obtained by frequency-domain smoothing and variable-time-constant time-domain smoothing.

16. (Original) A process according to any one of claims 9, 10, 12, 13, 14 and 15, wherein said variable-time-constant time-domain smoothing is performed by smoothing having both a fixed time constant and a variable time constant.

17. (Original) A process according to any one of claims 9, 10, 12, 13, 14 and 15, wherein said variable-time-constant time-domain smoothing is performed by smoothing having only a variable time constant.

18. (Currently Amended) A process according to claim 16 ~~or claim 17~~ wherein said variable time constant is variable in steps.

19. (Currently Amended) A process according to claim 16 ~~or claim 17~~ wherein said variable time constant is continuously variable.

20. (Currently Amended) A process according to claim 16 ~~or claim 17~~ wherein said variable time constant is controlled in response to measures of the relative levels of the input signals and their cross-correlation.

21. (Original) A process according to claim 6 wherein the smoothed energy level of each input signal is obtained by variable-time-constant time-domain smoothing the energy levels of each input signal with substantially the same time constant.

22. (Currently Amended) A process according to claim ~~3~~ 1 wherein the measures of the relative levels of the input signals and their cross-correlation are each obtained by variable-time-constant time-domain smoothing in which the same time constant is applied to each smoothing.

23. (Original) A process according to claim 8 wherein said measure of cross-correlation is a first measure of cross-correlation of the input signals and an additional measure of cross-correlation is obtained by applying a measure of the relative levels of the input signals to said first measure of cross-correlation to produce a direction-weighted measure of cross-correlation.

24. (Original) A process according to claim 23 wherein yet an additional measure of cross-correlation of the inputs signals is obtained by applying a scaling factor about equal to a value of a measure of cross-correlation of the input signals for the case of equal energy in each of the outputs.

25.-32. (Canceled)

33. (New) A process according to claim 17 wherein said variable time constant is variable in steps.

34. (New) A process according to claim 17 wherein said variable time constant is continuously variable.

35. (New) A process according to claim 17 wherein said variable time constant is controlled in response to measures of the relative levels of the input signals and their cross-correlation.

36. (New) A process for translating M audio input signals, each associated with a direction, to N audio output signals, each associated with a direction, wherein N is larger than M, M is two or more and N is a positive integer equal to three or more, comprising

providing an M:N variable matrix,

applying said M audio input signals to said variable matrix,

deriving said N audio output signals from said variable matrix, and

controlling said variable matrix in response to measures of (1) the relative levels of said input signals, and (2) the cross-correlation of said input signals so that a soundfield generated by said output signals has a compact sound image in the nominal ongoing primary direction of the input signals when the input signals are highly correlated, the image spreading from compact to broad as the correlation decreases and progressively splitting into multiple compact sound images, each in a direction associated with an input signal, as the correlation continues to decrease to highly uncorrelated,

wherein a first measure of the cross-correlation of the input signals is in response to a smoothed common energy of the input signals divided by the M^{th} root of the product of the smoothed energy level of each input signal, where M is the number of inputs, and

wherein an additional measure of cross-correlation is obtained by applying a measure of the relative levels of the input signals to said first measure of cross-correlation to produce a direction-weighted measure of cross-correlation, and

wherein yet an additional measure of cross-correlation of the inputs signals is obtained by applying a scaling factor about equal to a value of a measure of cross-correlation of the input signals for the case of equal energy in each of the outputs.